GREAT STRIKE-SLIP PLATE BOUNDARY ZONE OF THE S.E. CORNER OF THE CARIBBEAN

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ABSTRACT

Interpretations by Jim Pindell and various co-authors have shown that a rifted margin formed when the Yucatan left the North Coast of South America at about the end of the Jurassic (roughly 150 Ma). Since the Caribbean plate entered the Atlantic (about 75 Ma) its southern boundary has interacted with that rifted margin. I focus on the area east of the place where the Bocono fault reaches the sea. Motion of that part of the Caribbean plate with respect to South America for the past 3.5 Ma is given by NUVEL-1 as 68 degrees E of S but this is poorly constrained. I interpret the E-W strike of the North Coast - Coche and El Pilar faults and the shape of the Cariaco Trench as indicating motion close to E-W. I am impressed by the wide earthquake distribution which suggests to me that the strike-slip Plate Boundary Zone (PBZ) extends from the latitude of Grenada to the middle of the Delta Amacuro, a distance of 250 km.

I relate the great width of the PBZ and the depth of some of its earthquakes to the old, cold and strong nature of the continental and oceanic lithosphere of the rifted boundary of South America. The Trinidad hinge of the Caribbean plate is propagating eastward into 150 Ma ocean floor at about 20 mm/year. Great strains and infrequent huge earthquakes might be predicted for the hinge zone but the strain in the old lithosphere is surely being modified by the load of 15 or more km of rock in the overlying Orinoco Delta.

The cold and strong lithosphere in the PBZ can explain not only its great width but also the huge flower structure that it accommodates with southward thrusts in Venezuela of up to 100 km. Earthquakes at depths of over 100 km in the PBZ are consistent with a giant flower structure. The features discerned in northeastern Venezuela by lithospheric tomography are unrelated to Caribbean evolution. They developed the last time that these continental lithospheric rocks were hot enough to deform in one or both of the Pangean assembly collision at 250 Ma and the Pan-African collisions of 500 Ma.